

REMARKS

Applicants respectfully request that the above application be reconsidered, as amended. Claims 1-28 are currently pending.

Claims 1, 8 and 21 have been amended to recite ceramic compositions/thermal barrier coatings where the stabilizer component comprises: (a) a first metal oxide selected from the group consisting of yttria, calcia, ceria, scandia, magnesia, india and mixtures thereof in an amount of from about 3 to about 6 mole %; and (b) a second metal oxide selected from the group consisting of lanthana, gadolinia, neodymia, samaria, dysprosia, erbia, ytterbia, and mixtures thereof in an amount of from about 0.5 to about 4 mole % (or from about 0.8 to about 4 mole % for Claim 1). Support for these amendments can be found in paragraph [0022] at page 6 and [0027] at page 7 of the above application.

Claim 1 has been further amended to recite that when the first metal oxide comprises yttria and when the second metal oxide comprises lanthana, the stabilizer component comprises from about 5.5 to about 6.5 mole % yttria and from about 0.8 to about 1.5 mole % lanthana. Support for this amendment can be found in paragraph [0028] at page 8 of the above application. Claims 1, 8 and 21 have been further amended so that the first metal oxide does not include ceria.

In view of these amendments to Claim 1, Claim 3 has been amended to recite that the second metal oxide is selected from the group consisting of gadolinia, ytterbia and mixtures thereof and to conform to the amounts specified in Claim 1. Claim 6 has also been amended to conform to the amendments to Claim 1.

A. Response to Rejection of Claims 3, 13 and 25 under 35 USC 112, Second Paragraph

At page 2 of the Office Action, the Examiner has rejected Claims 3, 13 and 25 under 35 USC 112, second paragraph, as being indefinite. The Office Action alleges Claim 3 is contradictory to Claim 2 on the following basis: (a) Claim 3 refers to yttria at 3-5 mole % and the second oxide at 0.5-4 mole % that may add up to 9 mole % if the maximum of both is used while Claim 2 sets the upper limit at 8 mole %; and (b) if the smaller amounts (3 and 0.5 mole %) in Claim 3 are taken, they do not add up to the minimum (5 mole %) "required" by Claim 2. The Office Action suggests similar inconsistencies for Claims 13 (relative to Claim 12) and 25 (relative to Claim 24).

Claims 3, 13 and 25 are entirely consistent with Claims 2, 12 and 24 they depend from if read appropriately in context, and are therefore compliant with 35 USC 112, second paragraph. Contrary to what the Office Action suggests, Claims 2, 12 and 24 define what the total amount of stabilizing component can be in Claims 3, 13 and 25, *i.e.*, from about 5 to about 8 mole % stabilizing component. In addition, Claims 3, 13 and 25 define how much the first metal oxide (yttria) can comprise of this total amount and how much the second metal oxide (lanthana, gadolinia, ytterbia and mixtures thereof) can comprise of this total amount.

Indeed, what demonstrates the consistency of Claims 3, 13 and 25 is that the combined minimum amount of the first metal oxide (3 mole %) with the maximum amount of the second metal oxide (4 mole %), as well as the combined maximum amount (5 mole %) of the first metal oxide with the minimum amount (0.5 or 0.8 mole %) of the second metal oxide both fall within the range of total amounts of stabilizing component defined in Claims 2, 12 and 24. The combined minimum amounts, as well as the combined maximum amounts, of the first and second metal oxide referred to in the Office Action are simply not relevant to whether Claims 3, 13 and 25 are definite under 35 USC 112, second paragraph.

B. Response to Rejection of Claim 1 under 35 USC 102(b) as Anticipated by Nakayama et al

At page 3 of the Office Action, the Examiner has rejected Claim 1 under 35 USC 102(b) as anticipated by Nakayama et al.

Responsive to this rejection, Claim 1 has been amended to recite that, when the first metal oxide comprises yttria and when the second metal oxide comprises lanthana, the stabilizer component comprises from about 5.5 to about 6.5 mole % yttria and from about 0.8 to about 1.5 mole % lanthana.

Claim 1, as now amended, is distinguishable over Nakayama et al. The amount of yttria now defined in Claim 1 (from about 5.5 to about 6.5 mole %) when the stabilizer component also comprises lanthana exceeds that taught in Nakayama et al (2.6 mole %). The amount of the second metal oxide now defined in Claim 1 (from about 0.8 to about 4 mole %) also exceeds the amount of neodymia or samaria taught in Nakayama et al (0.3 mole %).

Accordingly, Claim 1, as amended, is novel and unobvious over Nakayama et al.

C. Response to Rejection of Claims 1-2 under 35 USC 102(b) as Anticipated by Mazdiyasni et al

At page 3 of the Office Action, the Examiner has rejected Claims 1-2 under 35 USC 102(b) as anticipated by U.S. Patent 3,525,597 (Mazdiyasni et al).

Claims 1-2, as now amended, are distinguishable over Mazdiyasni et al. Contrary to what the Office Action suggests, Mazdiyasni et al does not teach combinations of yttrium oxide with dysprosium oxide and ytterbium oxide according to Claims 1-2. Instead, Mazdiyasni et al teaches that the metallic oxide can be yttrium oxide, dysprosium oxide or ytterbium oxide. See abstract and col. 2, lines 54-55.

Accordingly, Claims 1-2, as amended, are novel and unobvious over Mazdiyasni et al.

D. Response to Rejection of Claims 1-5, 8-15 and 18-27 under 35 USC 102(b) as Anticipated by Rickerby et al

At page 3 of the Office Action, the Examiner has rejected Claims 1-5, 8-15 and 18-27 under 35 USC 102(b) as anticipated by U.S. Patent 6,025,078 (Rickerby et al).

Responsive to this rejection, Claims 1, 8 and 21 have been amended to recite that the amount of the first metal oxide (e.g., yttria) is in the range of from about 3 to about 6 mole % and that the amount of the second metal oxide (e.g., erbia) is in the range of from about 0.8 to about 4.0 mole % (Claim 1) or from about 0.5 to about 4.0 mole % (Claims 8 and 21).

Claims 1-5, 8-15 and 18-27, as now amended, are distinguishable over Rickerby et al. Rickerby et al teaches ceramic barrier coatings that comprise zirconia, from 4 to 20 wt.% of a first metallic oxide (yttria, calcia, magnesia, india, scandia or ytterbia), and from 5 to 25 wt. % of a second metallic oxide (dysprosia, erbia, europia, gadolinia, neodymia, praseodymia, urania, or ytterbia). See col. 2, lines 27-61. With the exception of Examples 1-3, Rickerby et al provides little guidance as to what specific levels or combinations of the first metallic oxide and the second metallic oxide should be picked within these broad ranges.

Indeed, a closer review of the ceramic coatings exemplified by Examples 1-3 show that Rickerby et al does not teach or suggest the ceramic compositions/thermal barrier coatings of Claims 1-5, 8-15 and 18-27, as now amended. Examples 1-3 of Rickerby et al disclose ceramic thermal barrier coatings comprising zirconia, yttria and erbia. The amount of erbia included in the coatings of these Examples is disclosed to be 8.4 mole %, 8.2 mole % and 5.4 mole %,

respectively. These amounts of erbia taught in the Examples of Rickerby et al exceed the levels of second metal oxide now defined in Claims 1-5, 8-15 and 18-27.

Accordingly, Claims 1-5, 8-15 and 18-27, as now amended, are novel and unobvious over Rickerby et al.

E. Response to Rejection of Claims 1, 8-9 and 21-23 under 35 USC 102(b) as Anticipated by Alpine et al

At page 3 of the Office Action, the Examiner has rejected Claims 1, 8-9 and 21-23 under 35 USC 102(b) as anticipated by U.S. Patent 6,333,118 (Alpine et al).

Responsive to this rejection, Claims 1, 8 and 21 have been amended to recite that the first metal oxide does not include ceria.

Claims 1, 8-9 and 21-23, as now amended, are distinguishable over Alpine et al. Other than ceria, Alpine et al does not teach or suggest including in its ceramic coating any of the other first metal oxides of Claims 1, 8-9 and 21-23.

Accordingly, Claims 1, 8-9 and 21-23, as amended, are novel and unobvious over Alpine et al.

F. Response to Rejection of Claims 1-28 under 35 USC 102(a) as Anticipated by Rigney et al

At page 4 of the Office Action, the Examiner has rejected Claims 1-28 under 35 USC 102(a) as anticipated by U.S. Patent 6,586,115 (Rigney et al).

Responsive to this rejection, Claims 1, 8 and 21 have been amended to recite that the amount of the first metal oxide (e.g., yttria) is in the range of from about 3 to about 6 mole % and that the amount of the second metal oxide (e.g., lanthana) is in the range of from about 0.8 to about 4.0 mole % (Claim 1) or from about 0.5 to about 4.0 mole % (Claims 8 and 21). Claim 1 has further been amended to recite that, when the first metal oxide comprises yttria and when the second metal oxide comprises lanthana, the stabilizer component comprises from about 5.5 to about 6.5 mole % yttria and from about 0.8 to about 1.5 mole % lanthana.

Claims 1-28, as now amended, are distinguishable over Rigney et al. The amount of yttria (from about 5.5 to about 6.5 mole %) now defined in Claim 1 when the second metal oxide comprises lanthana exceeds the level of yttria (up to 3 wt. %) taught in Rigney et al. See col. 2, lines 60-62 and col. 3, lines 10-17. The amount of first metal oxide (from about 3 to about 6

mole %) defined in Claims 8 and 21, as well as in Claim 1 when the stabilizing component does not comprise yttria and lanthana, also exceeds the level of yttria taught in Rigney et al when alloyed with lanthana or the other metal oxides taught therein.

Accordingly, Claims 1-28, as amended, are novel and unobvious over Rigney et al.

G. Response to Rejection of Claims 1-28 under 35 USC 102(a) as Anticipated by Bruce

At page 4 of the Office Action, the Examiner has rejected Claims 1-28 under 35 USC 102(a) as anticipated by U.S. Patent Application 2003/0224200 (Bruce).

Claims 1-28, as now amended, are distinguishable over Bruce. While Bruce suggests that lanthana, neodymia and/or tantalum additions up to 5 or 10 weight % each, or up to 10 weight % total, can improve the impact resistance of yttria-stabilized zirconia at levels of yttria that can broadly range from about 1 to about 10 weight % (see paragraph [0023] at page 3 of Bruce), Bruce also teaches that the greatest impact resistance for lanthana, neodymia and/or tantalum additions occurs when the level of yttria is 4 weight % or less (see paragraph [0017] at page 2 and paragraph [0023] at page 3 of Bruce). The range of yttria (from about 5.5 to about 6.5 mole %) now defined in Claim 1 when the second metal oxide comprises lanthana is narrower than the broad range of yttria taught by Bruce and is greater than the 4 weight % or less yttria that Bruce suggests is preferred, and is therefore not taught or suggested by Bruce. The amount of first metal oxide (from about 3 to about 6 mole %) defined in Claims 8-9 and 21-23, as well as in Claim 1 when the stabilizing component does not comprise yttria and lanthana, is also narrower than the broad range of yttria taught by Bruce and is also greater than the 4 weight % or less yttria that Bruce suggests is preferred, and is therefore not taught or suggested by Bruce.

Accordingly, Claims 1-28, as amended, are novel and unobvious over Bruce.

H. Response to Rejection of Claims 2-7 under 35 USC 103(a) as Unpatentable over Nakayama et al

At pages 4-5 of the Office Action, the Examiner has rejected Claims 2-7 under 35 USC 103(a) as unpatentable over Nakayama et al.

Responsive to this rejection, Claim 1, from which Claims 2-7 depend, has been amended to recite that, when the first metal oxide comprises yttria and when the second metal oxide comprises lanthana, the stabilizer component comprises from about 5.5 to about 6.5 mole % yttria and from about 0.8 to about 1.5 mole % lanthana.

Claims 2-7, as now amended, are distinguishable over Nakayama et al. The amount of yttria now defined in Claims 2-7 (at least about 5.5 mole %) when the stabilizer component also comprises lanthana exceeds that taught in Nakayama et al (2.6 mole %). The amount of the second metal oxide now defined in Claims 2-7 (at least about 0.8 mole %) also exceeds the amount of neodymia or samaria taught in Nakayama et al (0.3 mole %).

Accordingly, Claims 2-7, as amended, are unobvious over Nakayama et al.

I. Response to Rejection of Claims 3-5 under 35 USC 103(a) as Unpatentable over Mazdiyasni et al

At page 5 of the Office Action, the Examiner has rejected Claims 3-5 under 35 USC 103(a) as unpatentable over Mazdiyasni et al.

Claims 3-5, as now amended, are distinguishable over Mazdiyasni et al. Contrary to what the Office Action suggests, Mazdiyasni et al does not teach combinations of yttrium oxide with dysprosium oxide and ytterbium oxide according to Claims 3-5. Instead, Mazdiyasni et al teaches that the metallic oxide can be yttrium oxide, dysprosium oxide or ytterbium oxide. See abstract and col. 2, lines 54-55.

Accordingly, Claims 3-5, as amended, are unobvious over Mazdiyasni et al.

J. Response to Rejection of Claims 1, 8-9 and 21-23 under 35 USC 103(a) as Unpatentable over Litton et al

At page 5 of the Office Action, the Examiner has rejected Claims 1, 8-9 and 21-23 under 35 USC 103(a) as unpatentable over U.S. Patent 6,730,422 (Litton et al).

Claims 1, 8-9 and 21-23, as now amended, are distinguishable over Litton et al. As indicated in the Office Action, Litton et al teaches a ceramic material useful as a thermal barrier coating where the first oxide can be zirconia, where the second metal oxide can be at least one of lanthana and samaria in an amount of 5-60 mol %, and where yttria can be present in an amount of 5-60 mol %. See col. 5, lines 24-33. By contrast, Claims 1, 8-9 and 21-23, as amended, define a lower level of samaria (from about 0.5 to about 4 mole %) and lanthana (from about 0.8 to about 1.5 mole % for Claim 1 and from about 0.5 to about 4 mole % for Claims 8-9 and 21-23) than that taught by Litton et al.

Accordingly, Claims 1, 8-9 and 21-23, as amended, are unobvious over Litton et al.

K. Conclusion

In conclusion, Claims 1-28, as amended, comply with the requirements of 35 USC 112, second paragraph. Claims 1-28, as amended, are also novel and unobvious over the prior art relied in the Office Action. Accordingly, Applicants respectfully request that Claims 1-28, as amended, be allowed to issue in the above application.

Respectfully submitted,
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